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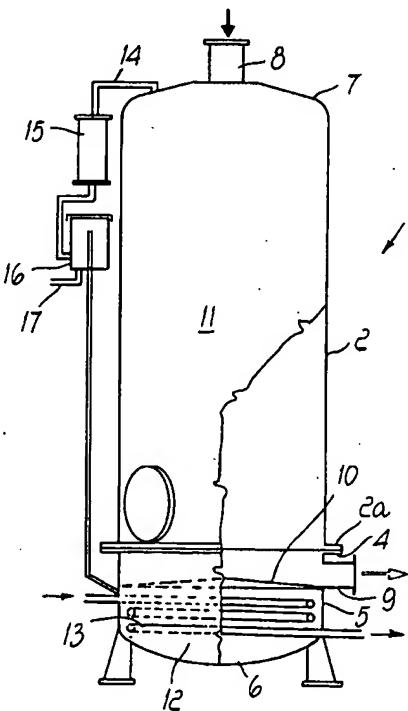
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(54) Activated-carbon solvent treatment unit for dry-cleaning machines with modified regeneration unit.

(57) An activated-carbon solvent treatment unit for dry-cleaning machines with improved regeneration unit which comprises a cylindrical container (2) with a vertical axis that extends vertically and has a convex hood (7) and base (6); the container (2) is internally provided with a deflector (10) that forms an activated-carbon containment compartment (11) in an upward region and, in a downward region, a water containment compartment (12) which contains heating elements (13) that are suitable to generate steam for flushing the carbon; said upward region and said lower region of said container (2) are connected by a flushing water return duct (14) that includes a condensation unit (15) and a water-solvent separator (16).



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The present invention relates to an activated-carbon solvent treatment unit for dry-cleaning machines with improved regeneration unit.

Dry-cleaning machines are known which include the so-called deodorization cycle in order to eliminate residual solvent traces from the cleaned garments: in practice, the washing drum is flushed by a stream of warm air that is able to remove even small traces of solvent and moisture from the garments; this stream is discharged outside through an activated-carbon filter which is suitable to recover part of the solvent present in the expelled air.

When the carbon is saturated with solvent, the activated-carbon filters are flushed in countercurrent with superheated steam for a so-called regeneration cycle: after flowing through the filter, the contact water is discharged into the sewage system.

At present, however, due to more restrictive pollution-control rules, the discharge of water containing solvent is no longer allowed if the solvent percentage exceeds extremely low values.

In addition to this, conventional activated-carbon filters have some drawbacks related to the fact that often the shape, dimensions and orientation of the filter are not such as to produce effective air treatment.

The technical aim of the present invention is to obviate the above described drawbacks of conventional devices, i.e. to provide an activated-carbon solvent treatment unit for dry-cleaning machines with an improved regeneration unit that does not entail the discharge of contact water containing solvent traces into the sewage system and produces very high solvent absorption.

Within the scope of this technical aim, an object of the present invention is to achieve the above aim and objects with a structure which is simple, relatively easy to produce in practice, safe in use and effective in operation, and has a relatively low cost.

This aim and these objects are all achieved by the present activated-carbon solvent treatment unit for dry-cleaning machines with improved regeneration unit, characterized in that it comprises a cylindrical container with a vertical axis that extends vertically and has a convex hood and base, said container being internally provided with a deflector that forms an activated-carbon containment compartment in an upward region and, in a downward region, a water containment compartment which contains heating elements that are suitable to generate steam for flushing the carbon, the upward region and the downward region of the container lower compartment being connected by a flushing water return duct that includes a condensation unit and a water-solvent separator.

Further characteristics will become apparent and evident from the detailed description of a preferred but not exclusive embodiment of an activated-carbon solvent treatment unit for dry-cleaning machines with improved regeneration unit according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

5 figure 1 is a schematic side view of an activated-carbon solvent treatment unit for dry-cleaning machines with improved regeneration unit according to the invention.

10 With particular reference to the above figure, the reference numeral 1 generally designates an activated-carbon solvent treatment unit for dry-cleaning machines with increased absorption according to the invention.

15 The treatment unit 1 comprises a cylindrical container 2 with a vertical axis that extends vertically and preferably has a height that is twice its base diameter.

20 The container 2 has an access door 3 at its base.

25 The lower end of the container 2 has an edge 2a that is folded outward for fixing, by means of bolts, the outwardly folded edge 4 of a tubular body 5 that extends the container and to which a convex base 6 is welded in a downward region: a convex hood 7 is welded to the container 2 in an upward region.

30 35 The hood 7 is centrally connected to a tube 8 for the intake of the gaseous air-solvent mixture that arrives from a drum, whereas the tubular body 5 is connected to a tube 9 that returns the treated air to the drum (white arrows).

40 45 A filtering deflector 10 is mounted directly above the tube 9 in the body 5; an absorption chamber 11 is thus formed above the deflector and is filled with activated-carbon granules with appropriate size characteristics. A compartment 12 for containing the water for flushing the activated carbon is delimited below the deflector 10.

Heating elements are present in the compartment 12: in the particular case, these elements are constituted by an immersed heat-exchange coil 13 which is supplied in a closed circuit by a source of superheated steam (black arrows).

50 The hood 7 and the compartment 12 are mutually connected by a duct 14 for the return of the water from the flushing of the activated carbon; a condenser 15 and a separator 16 for separating the water from the solvent are installed in the duct 14; the solvent separated at 16 is drawn through a secondary pipe 17.

55 Operation of the treatment unit according to the invention is evident: the activated carbon is flushed in a closed circuit with locally-generated steam which, after flowing through the carbon, is con-

densed and reused after separating and removing the extracted solvent.

It is stressed that the shape and dimensions of the container 2 have been studied so as to give the filter maximum effectiveness: regeneration of the activated carbon by flushing with steam in counter-current allows to extract from the activated carbon, and thus separate from the water, most of the solvent that is present; the closed circuit of the contact water allows to flush the activated carbon without having to discharge the contact water externally.

It has thus been observed that the invention has achieved the intended aim and objects.

The invention thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept.

All the details may furthermore be replaced with other technically equivalent ones.

In practice, the materials employed, as well as the shapes and dimensions, may be any according to the requirements without thereby abandoning the protective scope of the following claims.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

### Claims

1. Activated-carbon solvent treatment unit for dry-cleaning machines with improved regeneration unit, characterized in that it comprises a cylindrical container (2) with a vertical axis that extends vertically and has a convex hood (7) and base (6), said container (2) being internally provided with a deflector (10) that forms an activated-carbon containment compartment (11) in an upward region and, in a downward region, a water containment compartment (12) which contains heating elements (13) that are suitable to generate steam for flushing the carbon, said upward region and said downward region of said container (2) being connected by a flushing water return duct (14) that includes a condensation unit (15) and a water-solvent separator (16).
2. Treatment unit according to claim 1, characterized in that said heating elements (13) are constituted by an immersed coil which is connected to a source of superheated steam.

3. Treatment unit according to claim 1, characterized in that the height of the container (2) is substantially twice its diameter.

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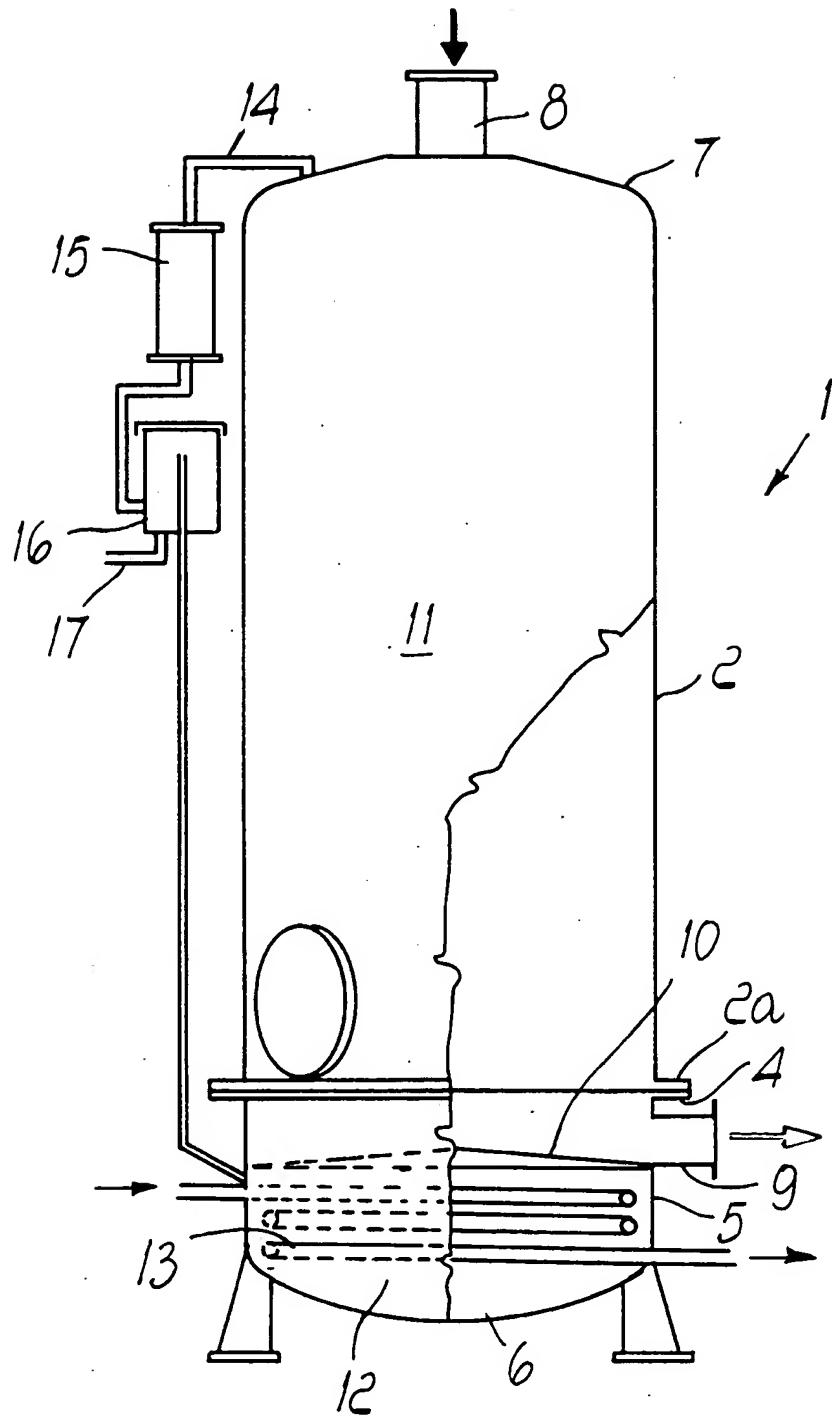
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## EUROPEAN SEARCH REPORT

Application Number  
EP 94 10 4180

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.)
A	US-A-4 513 590 (DUAL FILTREX INC.) * column 5, line 20 - line 46; figure 1 * ---	1,3	D06F43/08
A	US-A-3 095 284 (RESEARCH DEVELOPPEMENT CO.) * column 3, line 14 - line 45; figure 1 * ---	1	
A	FR-A-1 209 244 (SOCIETE NOUVELLE PICA) * page 3, column 1, line 33 - column 2, line 11; figure 1 * ---	1	
A	US-A-4 443 344 (J.O. LEWIS) * column 2, line 63 - column 3, line 38; figure * -----	1,2	
TECHNICAL FIELDS SEARCHED (Int.Cl.)			
D06F			
<p>The present search report has been drawn up for all claims</p>			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	21 July 1994	Courrier, G	
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	